

8.2 CALVERT COUNTY

This chapter presents information about stream conditions of potential management interest in Calvert County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001e.

8.2.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of Calvert County streams during 2000-2004 was Poor (Figure 8-42). The FIBI results indicate that 9% of the streams in the county were in Good condition, while 32% rated Good using the BIBI. Using the combined indicator (CBI), more than 55% of the streams in the county scored as Poor or Very Poor, 9% scored as Good, and 33% scored as Fair.

There was no apparent geographic trend in IBI scores in the county. The highest rated stream in Calvert County using the Combined Biotic Index (CBI) was Lyons Creek, while the lowest rated streams included Sullivan Branch, an unnamed tributary to Plum Point Creek and Buzzard Island Creek (Table 8-13). Based on Stream Waders volunteer data, the lower Patuxent River watershed was dominated by sites rated as Poor or Very Poor for benthic macroinvertebrates (Table 8-14).

One former MBSS Sentinel site was located in Calvert County, Plum Point Creek. Sentinel sites were chosen to provide a representation of the best remaining streams around the state and track natural variations in stream health. Where possible, Sentinel sites are located in watersheds with as much protected land as possible, or in areas projected to become degraded from development at a slower pace. In the case of Plum Point Creek, the site did not consistently maintain high Combined Biotic Index scores, so the site was dropped from the network. More information about the MBSS Sentinel stream network is found in: 2000-2004 Maryland Biological Stream Survey Volume 11: Sentinel Sites (http://www/dnr/Maryland.gov/streams/pubs/ea05-8_sentinel.pdf).

8.2.2 Physical Habitat

8.2.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), 12% of the streams in Calvert County had Minimally Degraded habitat, 38% had Partially Degraded habitat, and 50% had Degraded or Severely Degraded habitat (Figure 8-43). There was no strong geographic trend in physical habitat quality, except that all Severely Degraded sites were located in the northern part of the county.



8.2.2.2 Trash

An estimated 65% of the stream miles in Calvert County were rated Optimal for trash and only 9% were rated as being in Marginal condition (Figure 8-44). In general, trash levels were higher in the northern part of the county.

8.2.2.3 Channelization

An estimated 9% of the stream miles in Calvert County had some degree of channelization (Table 8-4). The documented channelization was in the form of a dredged channel. No geographic trend was evident (Figure 8-45).

8.2.2.4 Inadequate Riparian Buffer

No stream miles in Calvert County were devoid of riparian buffers during the 2000-2004 MBSS (Table 8-3). However, 9% of stream miles had severe breaks in existing riparian buffers. No geographic trend in buffer breaks was evident (Figure 8-46). Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www/dnr/Maryland.gov/streams/pubs/ea05-7_riparian.pdf).

8.2.2.5 Eroded Banks/Bedload Movement

Nearly 41% of the stream miles in Calvert County were rated as Optimal for bank erosion (Figure 8-47). However, 35% of the streams in the county were rated as Poor, and an additional 10% were Marginal. No geographic trend in bank erosion was evident within the county.

An estimated 77% of stream miles in Calvert County had extensive or moderate development of instream bars (Figure 8-47). No streams were devoid of bars, and 23% had minor bar formation. No geographic trend in bank erosion was evident within the county.

8.2.3 Key Nutrients

8.2.3.1 Nitrate-Nitrogen

Nearly 91% of the stream miles in Calvert County had only background levels of nitrate-nitrogen (Figure 8-48). The remaining 9% of stream miles had elevated nitrate-nitrogen, but not above 5 mg/l, the level at which biological effects are apparent in MBSS data. Most of the sites with slightly elevated nitrate-nitrogen levels were found in the northern portion of the county.

8.2.3.2 Total Phosphorus

Only 12% of the streams in Calvert County had total phosphorus levels at or below the range of values found in streams with mostly forested watersheds (> 90%) in Maryland (Figure 8-49). Over 88% of stream miles had elevated levels of total phosphorus, and of those streams with elevated levels, nearly 47% were above the threshold associated with impacts to stream biota. Total phosphorus levels were much higher in the northern part of the county. The only sites with low total phosphorus values were located south of Prince Frederick.

8.2.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www/dnr/Maryland.gov/streams/pubs/ea05-6_biodiv.pdf).

Of the three watersheds found in Calvert County, the highest rated for stream and river biodiversity was Patuxent River Lower (Figure 8-50). In contrast, the West Chesapeake watershed was the lowest ranking for stream and river biodiversity in the county, and ranked 81st of 84 in Maryland. Any reaches that had either state-listed species or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.2.5 Stressors

At 85% of stream miles, the most extensive stressor characterized by the MBSS in Calvert County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found extensively were: streams with watershed >5% urban land use (77% of stream miles); eroded banks (44% of stream miles); non-native aquatic fauna (present in 21% of stream miles); acid deposition (observed in 8% of stream miles); and channelized streams (9% of stream miles).

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

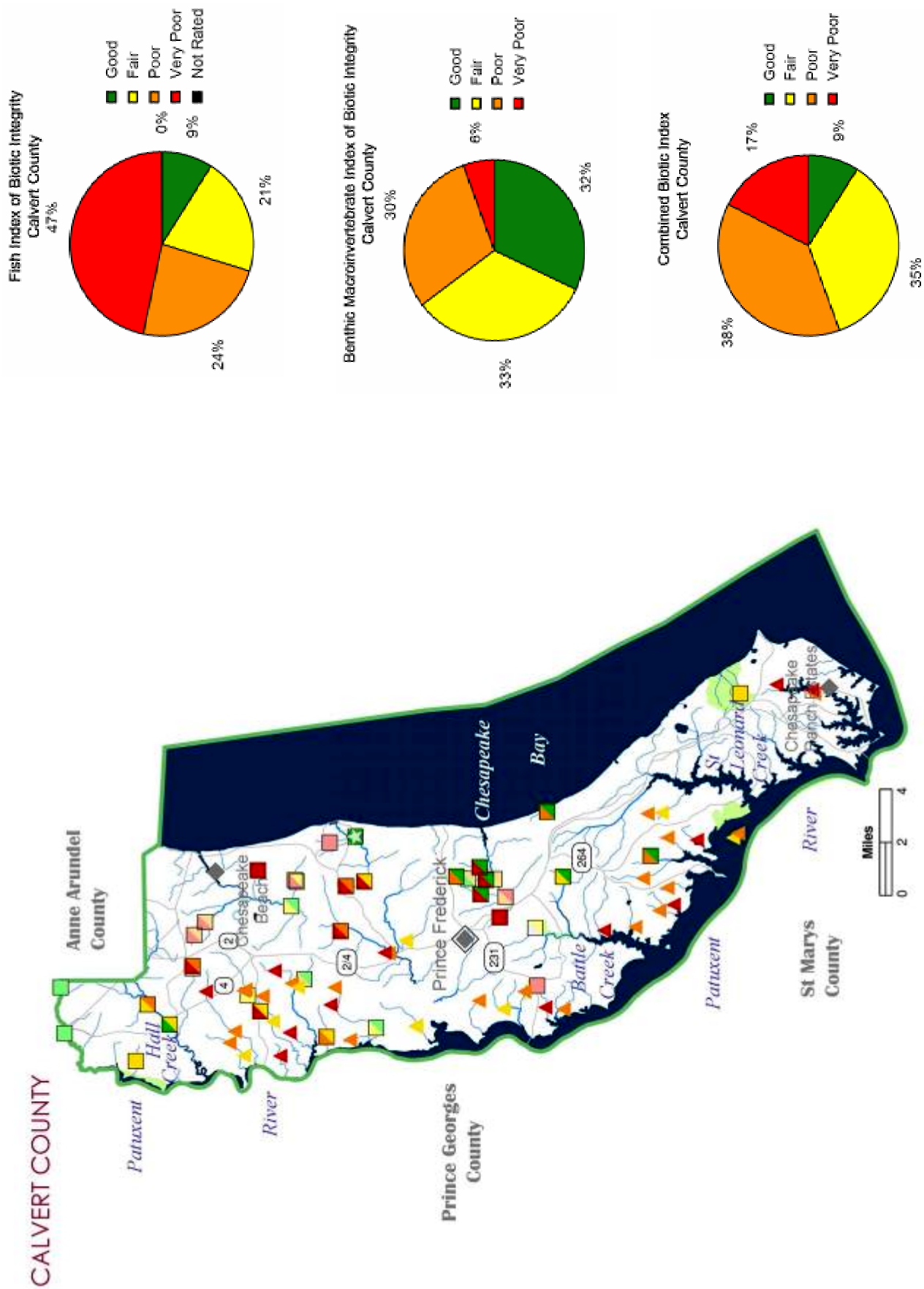


Figure 8-42. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Calvert County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

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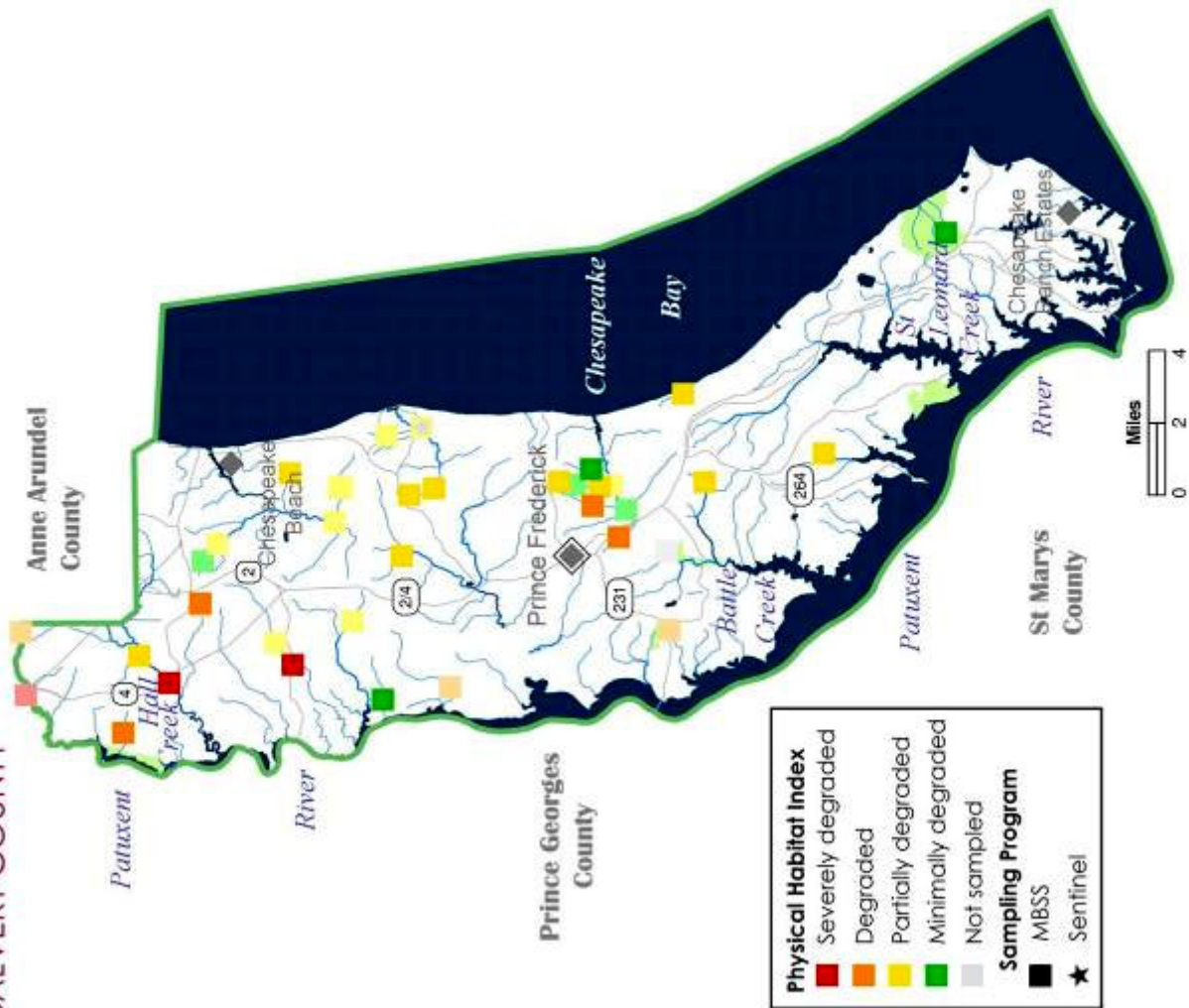


Figure 8-43. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Calvert County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

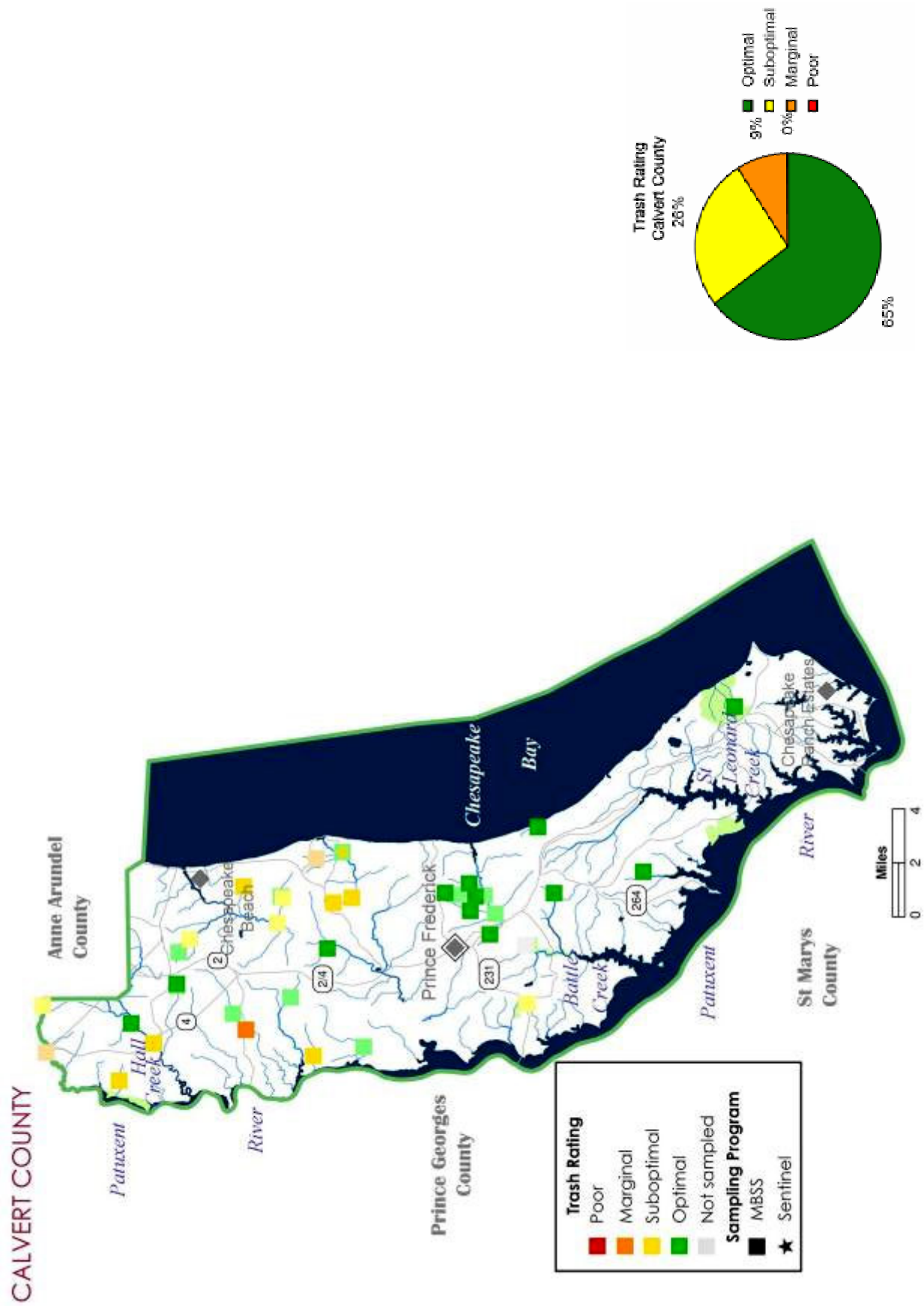


Figure 8-44. Pie chart and map of trash rating (0-20 scale) for Calvert County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

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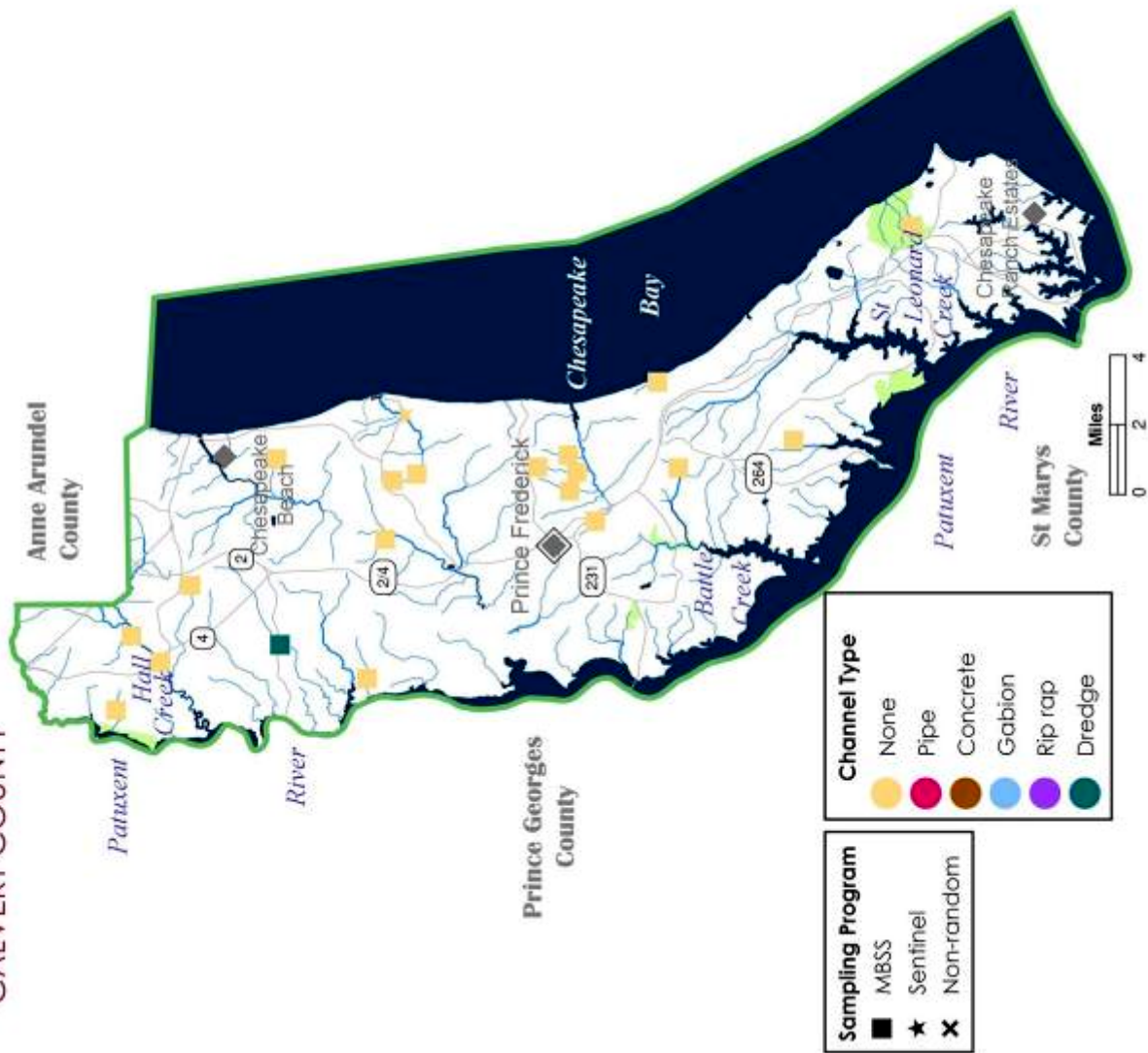


Figure 8-45. Map of channelized sites, by type, for Calvert County streams sampled by the MBSS during 2000-2004. *NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.*

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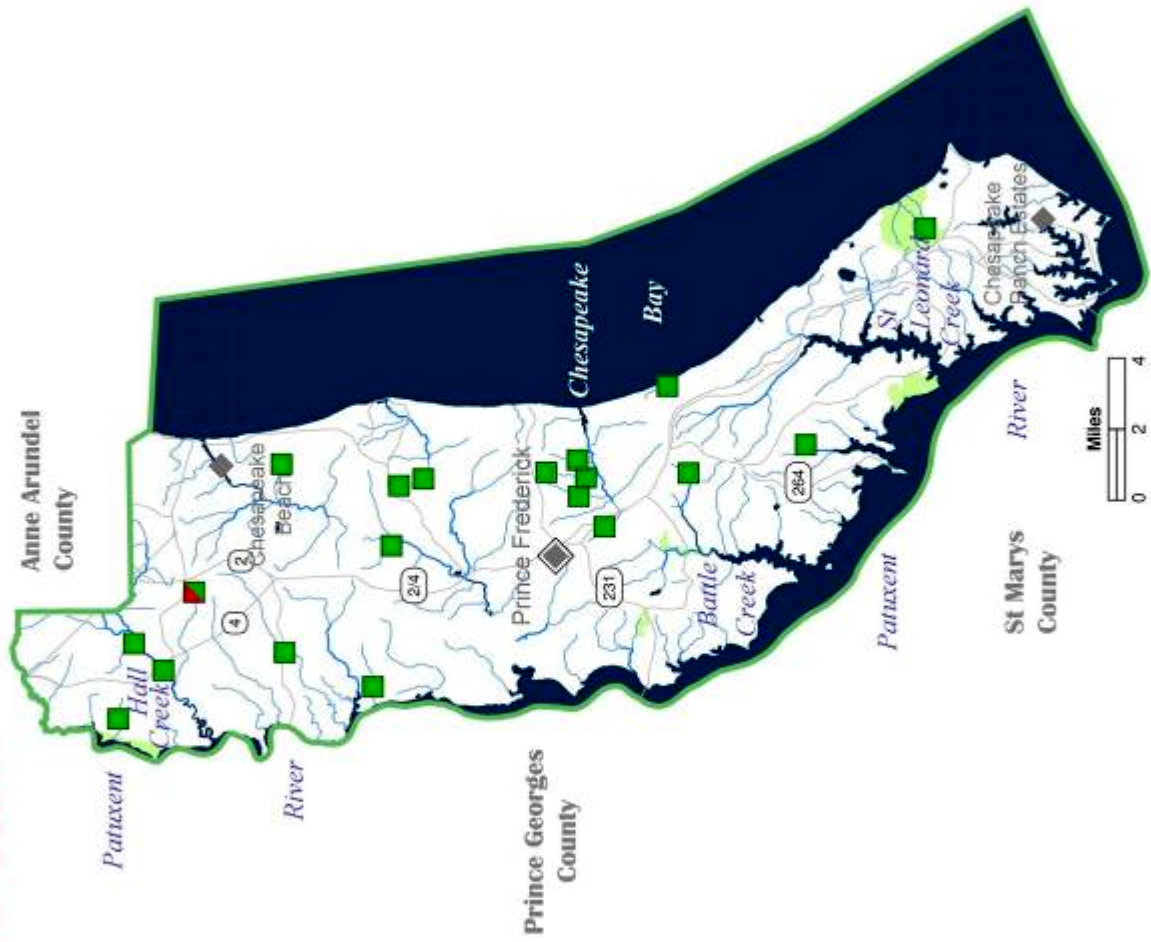


Figure 8-46. Map of sites with inadequate riparian buffers and buffer breaks for Calvert County streams sampled by the MBSS during 2000-2004. *NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.*

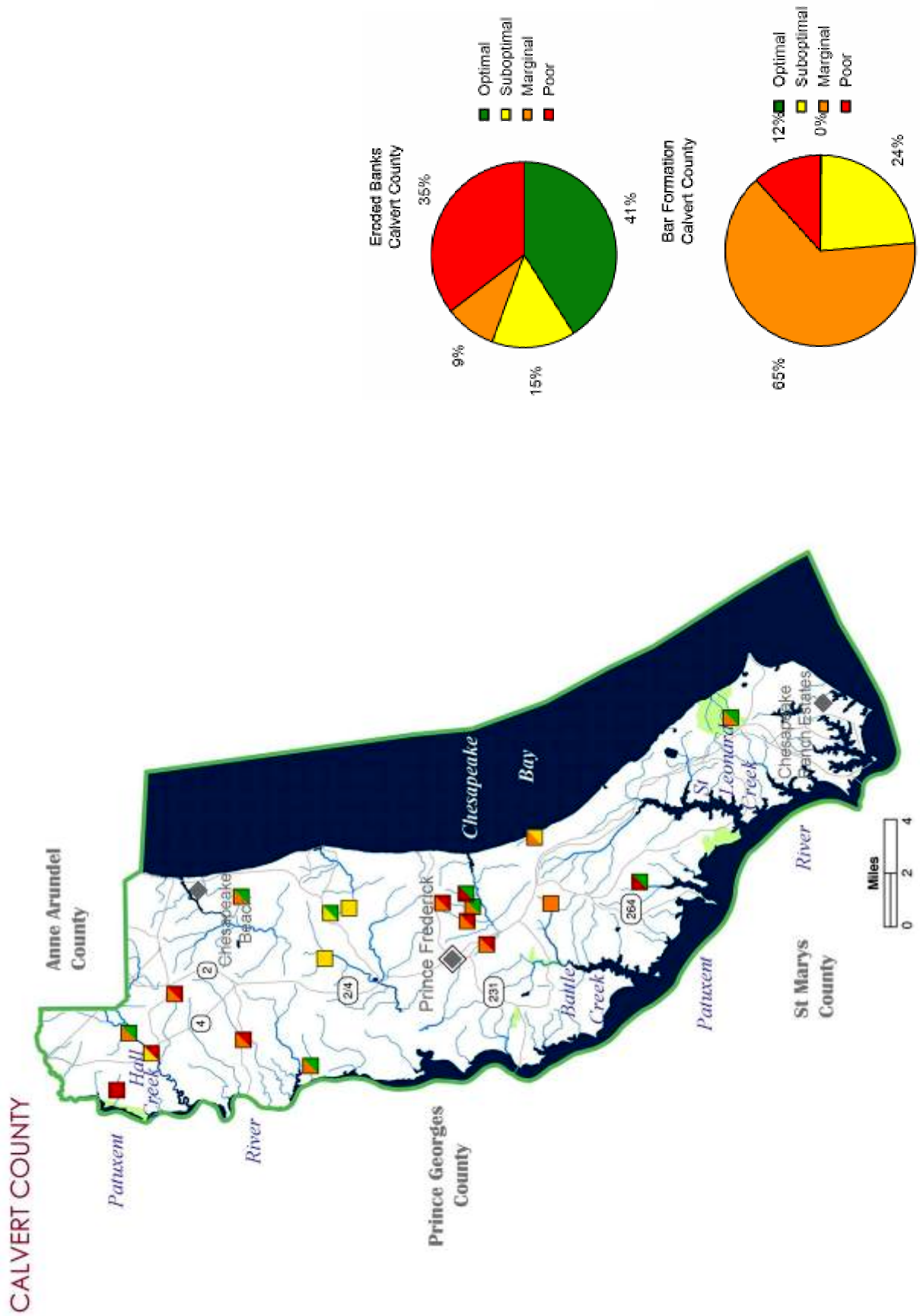


Figure 8-47. Pie charts and map of sites with eroded banks and instream bar formation for Calvert County streams sampled by the MBSS during 2000-2004

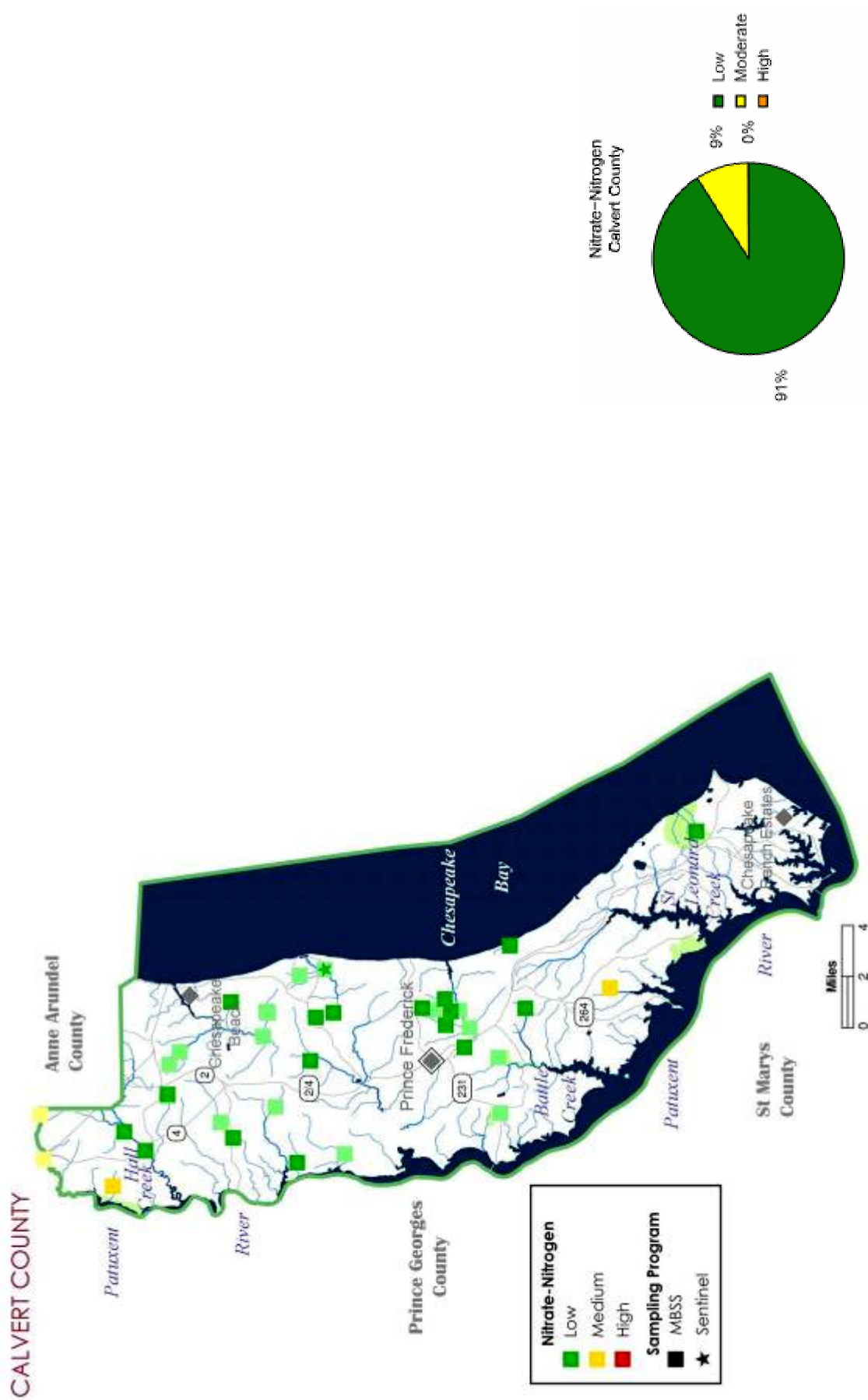
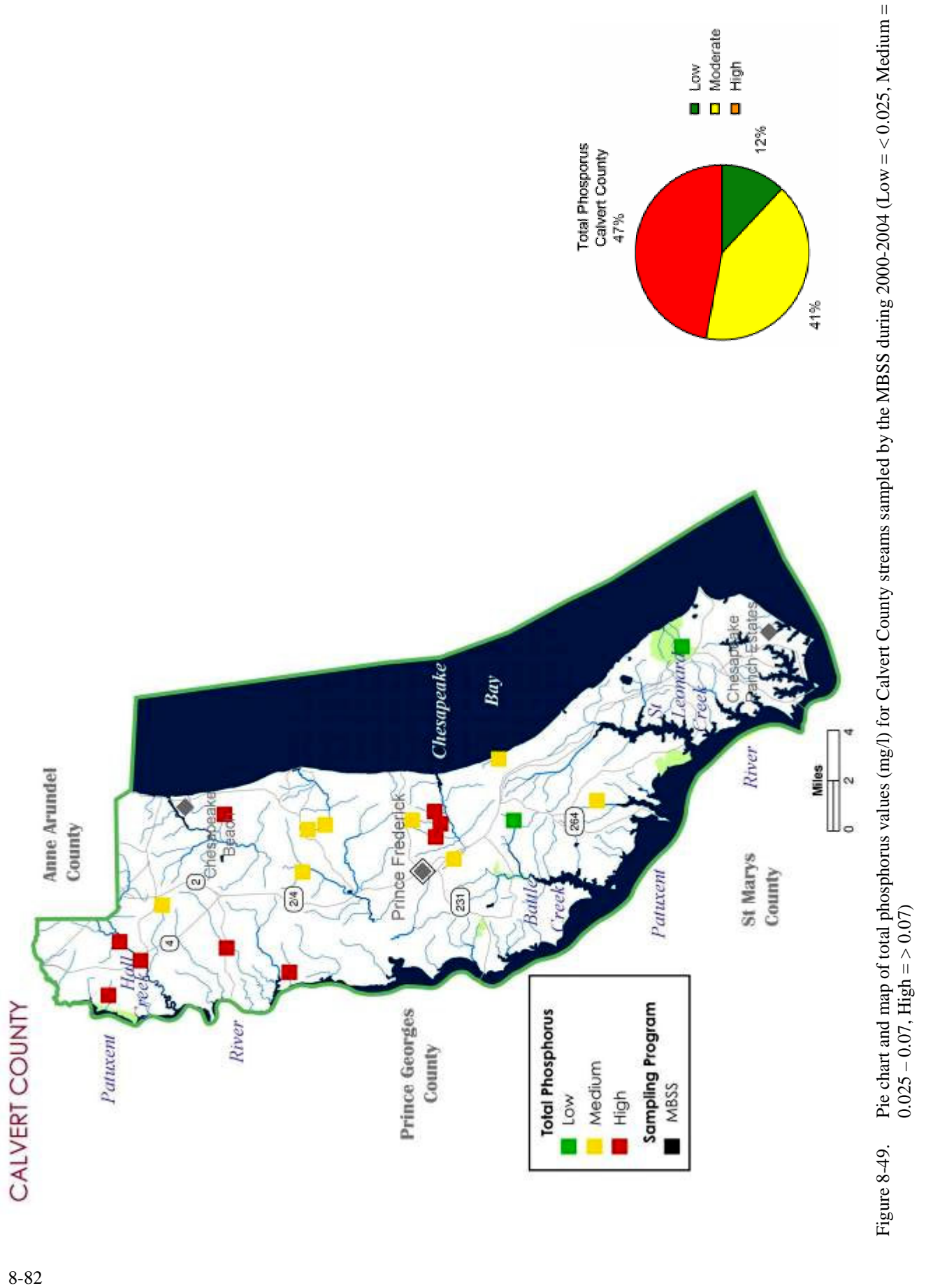


Figure 8-48. Pie chart and map of nitrate-nitrogen values (mg/l) for Calvert County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0)



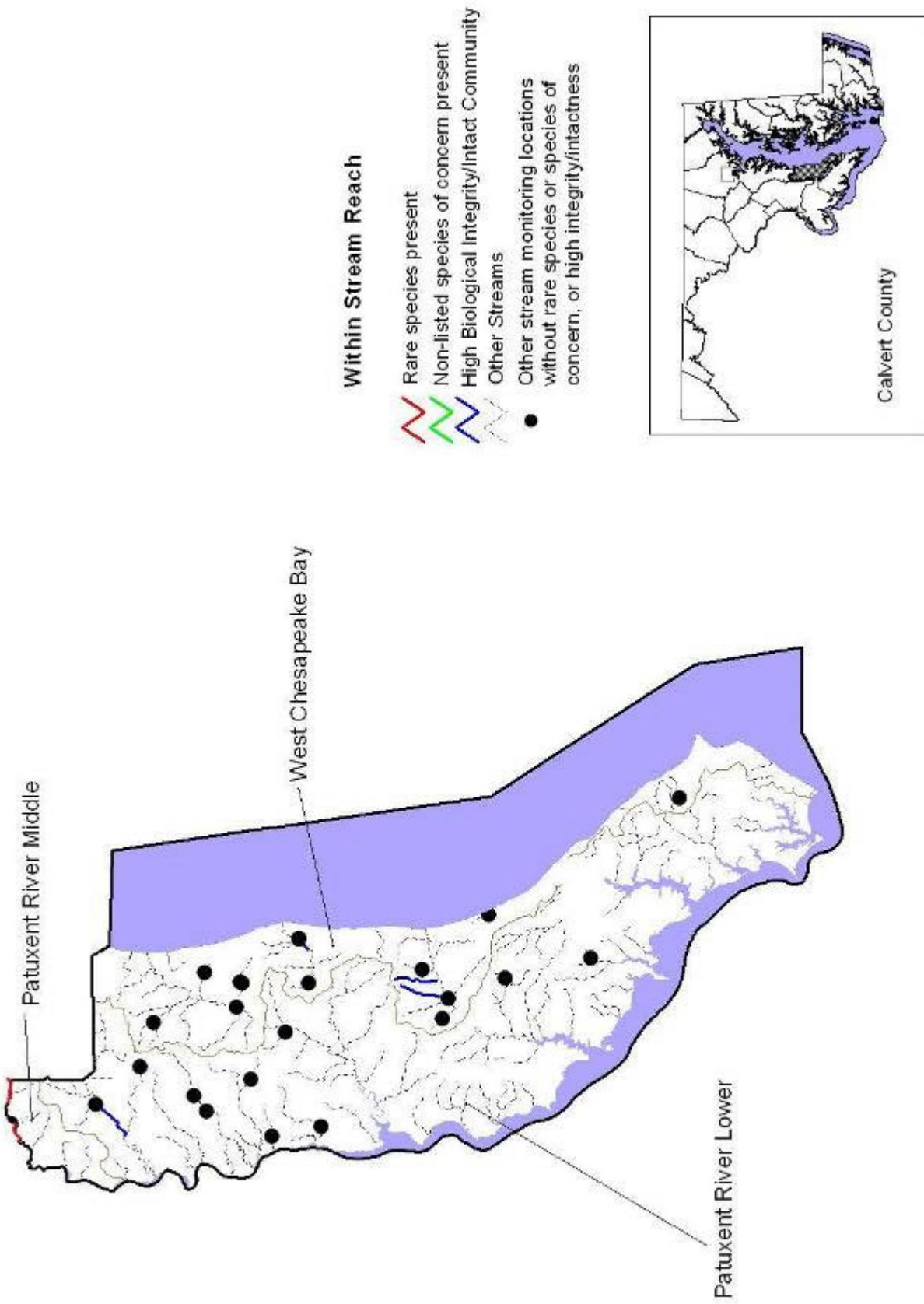


Figure 8-50. Aquatic Heritage Biodiversity Ranking map for Calvert County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.

